

PLZEŇSKÝ PRAZDROJ

CO₂ RECOVERY UNIT

KEY FACTS

Location
Pilsen
Czech Republic

Application
Brewery

Capacity
Two CO₂ installations of
3,000 kg/h overall

ENVIRONMENTAL PROTECTION WITH CO₂

In the Czech Republic Plzeňský Prazdroj pursues an ambitious environmental protection strategy - focused on CO₂ Recovery.

In 1999, Plzeňský Prazdroj (Pilsner Urquell and Gambrinus) became part of the SABMiller Group, back then the second largest brewery group worldwide. In 2002, the Pilsner breweries merged with the Radegast and Pivovar Velké Popovice breweries to create the present Plzeňský Prazdroj a. s. Approximately 10 million hectoliters of beer is produced each year by Plzeňský Prazdroj, making it the leading producer in Central Europe and the largest exporter of Czech beer.

"MORE BEER, LESS WATER" - that has consistently been the global strategy pursued in Pilsen since the end of the 1990s. Previously the brewery needed 10 hectoliters (hl) of water for each hl of beer, water consumption is now around 4.1 hl/hl beer.

Ambitions for other areas of sustainability are aimed similarly high. Among other aspects, the focus is on lowering the energy and CO₂ footprints. The latter was reduced by 20 percent over the past five years. For Plzeňský Prazdroj, consistent reliance in its production processes on fermentation CO₂ represents a strategic building block.

It is interesting to note that CO₂ recovery has been in place since 1993. In that year, CO₂ recovery was first set up at Pilsner Urquell. However, this installation did not generate the desired results both in

quantity and quality. Large quantities of CO₂ still had to be outsourced.

In 2002, the existing CO₂ plant was upgraded by Pentair Haffmans with the goal of raising quality and performance standards to the desired highly sophisticated level by means of state-of-the-art technology.

According to Jan Sik, Manager of Sustainable Development at Plzeňský Prazdroj, the decision to entrust Pentair Haffmans with this work was based on earlier positive experiences. At the time, Plzeňský Prazdroj's mother company had previously built several of its worldwide plants in co-operation with Pentair Haffmans, and was well aware of its knowhow and reliability.

An added bonus was Pentair Haffmans' convincing products including their unique scrubbers that incorporate a special pack characterized by a very extensive surface area. Back then, the competition either did not offer scrubbers with such packs or only ones that provided a significantly smaller surface area. Thanks to this far larger surface area, the scrubbers were significantly more efficient, resulting in reduced water consumption. These scrubbers, for the first time, enabled consumption figures of one liter with less fresh water per kilogram of CO₂ - a major consideration in a strategy of "More beer, less water".

The strip installation was yet another central aspect. This system enables the user to achieve extremely low energy

neutral oxygen levels in the recovered CO₂, which is of foremost importance especially for a hops based beer such as Pilsner Urquell that is prone to oxygenation.

The first expansion stage was the turnkey delivery of the following systems, each designed for a capacity of 1,000 kg/h:

- High efficiency scrubber
- Activated carbon filtration and dryer installation
- Strip installation

2008 saw an expansion, in the course of which sections of the installation were laid out for an additional 500 kg/h, along with others laid out to as much as 1,000 kg/h. The following systems were supplied in the context of this project:

- High efficiency scrubbers (500/1,000 kg/h)
- CO₂ compressor (500 kg/h)
- Activated carbon filtration and dryer installation (500/1,000 kg/h)
- Cooling installation with cooling medium R507 (500 kg/h)
- Strip installation (500/1,000 kg/h)
- CO₂ tank (65 t)

“ Since full operational start-up we have not had to buy any additional CO₂.

Jan Sik, Manager of Sustainable Development

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The CO₂ Recovery installation in the adjacent Gambrinus brewery was designed along similar line. Here again, the existing CO₂ plant from 1993 was upgraded to 1,500 kg/h by means of the following components:

- High efficiency scrubber
- Activated carbon filtration and dryer installation
- Cooling installation and cooling medium R507 (750 kg/h)
- Strip installation

A second turnkey expansion to an overall capacity of 1,500 kg/h followed in 2003. In this phase, the following were installed and started up at Gambrinus:

- Gas balloon
- CO₂ compressor (800 kg/h)
- Cooling installation with cooling medium R507 (750 kg/h)

As a result, the Prazdroj and Gambrinus breweries now operate CO₂ installations of 3,000 kg/h total capacity. These systems source CO₂ from the fermentation and pressure tank cellars, the degassing stations, and the filtration buffer tanks. This concept enables the breweries to achieve an optimum CO₂ yield, along with minimum CO₂ emission. Operating and maintenance costs of CO₂ recovery are negligible thanks to considerable CO₂ volume flows and storage capacities, and a near continual operating process.

With such installations, both Prazdroj and Gambrinus are CO₂ self-sufficient, meaning that their entire consumption is derived from their own sources. "Since full operational start-up of the last expansion phase and due to the investment into a CO₂ recovery system we have not had to buy any additional CO₂," Sik explained. "On the one hand, we thereby lower our costs while simultaneously reducing annual CO₂ emissions by 280 tons. Even more, actually, because some of this CO₂ was previously generated in part from fossil sources and transported to us by truck. And last but not least, we have the highest quality and safety standards.



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